Negotiating Flexible Prices*

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Abstract

In many markets, the price of a good or service is flexible. Buyers can either buy at the posted price or attempt to negotiate a lower price. A seller’s decision about whether to allow flexible prices and subsequent outcome in these types of markets depends, in large part, on buyer behavior. Furthermore, these markets are likely to feature substantial variation in buyer valuations. In this study we experimentally investigate how variation in buyer valuations impacts the negotiation process when prices are flexible. Specifically, how does a buyer’s value impact: (i) the buyer’s decision to negotiate the price, (ii) the buyer’s sequence of counter-offers, conditional on negotiating the price, (iii) the final negotiated price, and (iv) the length of the negotiation. Our results indicate that variation in buyer values do impact some parts of the negotiation process.

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1 Introduction

In many markets, goods are traded where the posted or list price is flexible; a potential buyer faces a choice, either explicit or implicit, of whether to purchase the good at the posted price, or negotiate with the seller in an attempt to purchase the good at a lower price.\(^2\) Examples of such markets include: real estate, automobile, big ticket consumer durables, services, and secondary markets. The outcome of these flexible price markets (i.e., the final sale price) will depend, in large part, on the negotiation tendencies of buyers; specifically, on whether the buyer decides to negotiate the price and, conditional on negotiating, the extent or degree to which the buyer negotiates?

A feature that is likely to characterize these flexible price markets is heterogeneity in buyer valuations for the good. This may be particularly true for real estate, automobiles, and used goods in the secondary markets where individual “tastes” are a heavily weighted component in the determination of one’s value. The motivation of this paper is to experimentally explore flexible price negotiations. In particular, we investigate how variation in buyer valuations impacts their negotiation tendencies and, ultimately, the outcome of the negotiations. We test whether the buyer's propensity to negotiate the price is impacted by the buyer’s value. Then, conditional on engaging in negotiations, we test if the buyer's negotiation decisions and the outcome on the negotiation are impacted by the buyer’s value.

An important issue arising in flexible price markets is whether sellers should actually employ flexible prices? That is, is it profitable for sellers to implement a pricing scheme where buyers

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\(^2\) For discussion regarding the motivation for flexible or “haggle” prices, the actual negotiation process in these settings, and the factors that influence this process, we refer readers to Kassaye (1990) and Stroeker and Antonides (1997).
can (attempt) to negotiate/haggle a discount, or rather, should sellers commit to a fixed, non-negotiable price? There exists a growing body of theoretical literature aimed at addressing this topic (Bester, 1993, 1994; Wang, 1995; Arnold and Lippman, 1998; Desai and Purohit, 2004; Raskovich, 2007; Gill and Thanassoulis, 2009, 2013). Specifically, these studies focus primarily on the comparison of flexible pricing and fixed pricing and the equilibrium implications under various market conditions and transaction structures. While the models in these studies differ, a common feature is that the optimal pricing decisions for sellers and the equilibrium predictions depend, in part, on buyer values, the proportion of buyers that negotiate, and/or the bargaining ability/skill of buyers. Furthermore, in several of these models (Wang, 1995; Arnold and Lippman, 1998; Desai and Purohit, 2004; Gill and Thanassoulis, 2009) heterogeneity in buyer values is explicitly assumed. Thus, in terms using these models to generate predictions about optimal seller behavior and market outcomes, it is important to understand the bargaining tendencies of buyers, and the interaction of these bargaining tendencies with heterogeneity in buyer values when prices are flexible, which is the aim of this study.

If we assume buyers are rational and selfish, then we would not expect a buyer’s value to directly impact their negotiation behavior; buyers would engage in negotiations with the seller when it is profitable to do so and, conditional on negotiating, try to negotiate the lowest possible price. However, this rules out the possibility that buyers may be influenced by other social-psychological factors. Yet, there exists a body of literature suggesting that negotiation behavior can be impacted by an agent’s reference point. The idea is that an outcome below (above) the reference point will be perceived as a gain (loss), and this perceived difference can differentially

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3 We postpone our discussion of how these factors impact the equilibria in these models until our concluding remarks. At that point, we will discuss the relevance and implications of our experimental findings as they relate to the predications in some of these papers.
impact negotiation behavior (Kahneman, 1992).\textsuperscript{4} Specifically, when in the domain of losses, agents may be less willing to make concessions (Bazerman et al., 1985; Neale et al., 1987; Neale and Bazerman; 1991), may make lower counter-offers (Kristensen and Garling, 1997a, 2000); may be less likely to reach an agreement (Bazerman et al., 1985; Neale et al., 1987; Neale and Bazerman; 1991; Kristensen and Garling, 1997a), and be less satisfied (Kristensen and Garling, 2000), compared to when being in the domain of gains. In regards to identifying the reference point, White et al. (1994), Kristensen and Garling (1997b), (1997c) document evidence that for buyers, their reservation value serves as the dominant reference point.

There also exists prior literature suggesting that price fairness can also impact the negotiation behavior of buyers.\textsuperscript{5} Namely a buyer may negotiate more (less) aggressively when the price perceives as being less (more) fair. Maxwell et al. (1999) document that buyers make more concessions, are more satisfied with the negotiation, and the negotiation is shorter when the posted price is perceived as being fair. Similarly, Kristensen (2000) find that buyers are more willing to buy at the posted price when the price is more fair. Herrmann (2004) investigates negotiation behavior at garage sales and finds that buyers indicated that they tend to engage in negotiations when prices are high, and refrain when prices are low; in particular, “sixty three

\textsuperscript{4} More generally, the idea that agents evaluate outcomes relative to a reference point was introduced in Prospect Theory by Kahneman and Tversky (1979). An agent’s value function is S-shaped around the reference point; convex in the domain of losses and concave in the domain of gains. This induces more (less) risk seeking in the domain of losses (gains). With respect to negotiations, the gain/loss domain can impact concession behavior and the likelihood an agreement is reached (see Neale and Bazerman, 1991; and Kahneman, 1992 for a discussion).

\textsuperscript{5} There is also a related body of literature documenting the importance of price fairness concerns of buyers in non-negotiation fixed price settings. For example, Huppertz et al. (1978) find that buyers are more likely to leave a store and complain if the price is unfair; similarly, Kahneman et al. (1986), Campbell (1999), and Maxwell (2002) find that unfair pricing can impact a buyers’ willingness to purchase. Along these lines, Thaler (1985) and Rotemberg (2011) develop formal models for incorporating a buyer's concern for price fairness in market transactions.
percent of questionnaired respondents indicated that they refrained from bargaining because ‘prices are reasonable’ (p. 70).

In the context of flexible price negotiations, the prior literature indicates that buyer valuations could impact their negotiation behavior along two plausible dimensions: First, it could change the reference point around which buyers are evaluating whether they are in the gain/loss domain, and the degree of the gain/loss. Second, it could change the buyer’s perception of the fairness of the posted price; for a given posted price, the larger a buyer’s value the more fair the buyer will perceive the posted price to be.⁶ In turn, changes in either of these two factors could result in buyers being less likely to negotiate the price the higher their value and, conditional on negotiating, the less aggressively they may negotiate.

To explore the negotiation tendencies of buyers, and the extent to which their behavior is impacted by their valuation, we consider an incentivized experiment centered around a stylized, bi-lateral, flexible price negotiation. Sellers are endowed with one unit of a fictitious good that is for sale at an exogenously determined posted price. Buyers, who have an induced value for the good, are given an opportunity to purchase the good from the seller at the posted price, or attempt to negotiate a lower price. Conditional on negotiating, an alternate-offer style negotiation process ensues. We systematically vary buyer valuations across the experimental treatments, while holding the posted price constant. As a result, by comparing across treatments, we are able to identify how buyer valuations impact their propensity to negotiate the price, their negotiation behavior, and the outcome of the negotiations.

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⁶ This idea is also consistent with the notion of “egocentric” biases of fairness assessments (see Thompson and Loewenstein, 1992 for discussion). Loewenstein et al. (1993) and Babcock et al. (1995) provide experimental evidence of egocentric fairness assessments in simulated pre-trial negotiations.
We find high rates of price negotiation across all treatments, and the exogenous manipulation of buyer values has very little impact on a buyer’s propensity to negotiate. Conditional on negotiating the price, buyers with higher values make higher initial counter-offers. Although, the data suggests that buyer values have very little impact on the actual final sale price of the good. However, we do find that buyers with higher values were able to reach a negotiated agreement quicker, i.e., they are able to reach a price agreement with less total counter-offers.

Before proceeding to the experimental design, we note that there are few relevant experimental studies that have explored topics relating to flexible prices. In a series of papers, Davis and Holt (1994), (1997), (1998) consider the role of seller’s having the ability to discount posted prices on market performance. In their experiments, buyers have the ability to request a discount from the seller. Cason et al. (2002) similarly compare market performance with fixed and flexible prices, and they allow for a more free form negotiation between buyers and sellers. These prior studies explore flexible prices in the context of a competitive market setting with multiple buyers and sellers, and focus on how flexible prices impact aggregate market outcomes (e.g., efficiency, average list price, and average transaction prices). Our study compliments these extant studies by specifically investigating buyer behavior in the bi-lateral negotiation process when prices are flexible, and how buyer values impact their negotiation behavior and the consequent outcome.

2 Experimental Design

2.1 Flexible Price Negotiation Task and Experimental Treatments

The experimental design is centered around a stylized, bi-lateral, flexible price negotiation task between a buyer and a seller. The seller is endowed with one unit of a fictitious good, referred to
as a “golden ticket”. The buyer, who has an induced valuation for the good, is tasked with trying to purchase the good from the seller. The transaction begins with each buyer having to make an explicit decision about whether to purchase the golden ticket from their paired seller at the initial posted price, or negotiate the price. If a buyer chooses to purchase the golden ticket at the posted price, then the task ends. Whereas, if the buyer chooses to negotiate, then an alternate-offer style price negotiation ensues, with the buyer making the initial counter-offer.

In order to isolate the effect that buyer valuations have on the negotiation process, the initial posted price is exogenously set to $10 and is held constant across all treatments, while the buyer’s value is systematically varied across treatments. Specifically, we consider three different buyer values, which correspond to the following three experimental treatments:

**Low Value (L-Value):** The buyer’s private value is $12

**Medium Value (M-Value):** The buyer’s private value is $15

**High Value (H-Value):** The buyer’s private value is $18

Across these three treatments, only the buyer’s value for the good is changing, while the other aspects of the negotiation process are held constant. As a result, by comparing across these treatments we are able to explore if, and to what extent, variation in buyer values affect negotiation behavior and the outcome.

In some flexible price markets, the posted price would likely be chosen by the seller. However, by exogenously setting the posted price to $10, we are able to systematically control

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7 In markets where the price is flexible, the posted price might not always be set by the agent that is selling the good. Said differently, it may not always be the case that the agent that set the price is the same as the selling agent that would be negotiating with potential buyers. Examples may include real estate
the magnitude of the difference between the buyer’s value and the posted price across the three treatments. In addition, the exogenous posted price minimizes reciprocity concerns that could motivate a buyer’s negotiation behavior in response to a posted price that was chosen by the seller. In particular, buyers may perceive a low (high) price set by the seller, relative to their value, as kind (unkind); in response, buyers may then be less (more) motivated to negotiate aggressively with that seller. By eliminating the seller’s choice of the posted price, we can isolate the effect of variation in buyer values on the negotiation process, which is the goal of this study.

In terms of payoffs, sellers are privately informed that if they sell the golden ticket to the buyer, they will receive the sale price as payment, and they will receive zero payment otherwise. Buyers are privately informed that if they buy the golden ticket, they will receive the difference between their value and the sale price as payment, and they will receive zero otherwise. Given that the value of the buyer’s outside option (the buyer’s payoff if the golden ticket is not purchased) is zero, the buyer’s maximum willingness to pay is simply his/her value; hence, the buyer’s value in this setting is equivalent to his/her reservation value (Raiffa, 1982).

In markets where the price is flexible, it is certainly possible that a buyer’s value is less than the posted price. However, in the experimental design we only consider buyer valuations that are larger than the posted price. This is done for several reasons: First, it allows for the possibility that buyers could conceivably forgo negotiations and purchase the good at the posted price; thus,

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transactions where the home owner sets the posted price, but the realtor is the selling agent, or automobiles where there owner sets the posted price, but the car sales person is the selling agent. Therefore, assuming that the price is exogenous, from the prospective of the selling agent and the buyer, may be reasonable in many flexible price markets.

\footnote{The general idea of reciprocity (Dufwenberg and Kirchsteiger, 2004; Falk and Fischbacher, 2006) is that agents are motivated to respond in a \textit{kind} manner to those who are kind to them, and an \textit{unkind} manner to those who are unkind to them.}
our ability to explore how the propensity to negotiate is affected by the buyer’s value.\(^9\) Second, it ensures that the bargaining zone is held constant across the three treatments. That is, the set of possible mutually agreeable negotiated prices lies between zero (the seller’s reservation) and $10 (the posted price) in all three treatments. This ensures that any observed differences across treatments are not a result of different size bargaining zones. Third, assuming their value is the reference point, it ensures that buyers perceive the negotiation as being in the domain of gain in all three treatments; hence, any differences across treatments will not be a result of a switch in the gain/loss domain.

2.2 Experimental Procedure

All experimental sessions were conducted in the Economic Science Laboratory (ESL) at the University of Arizona in the fall of 2012. All sessions were computerized, the software was programmed using z-Tree (Fischbacher, 2007), and all interactions between participants were anonymous. All participants were University of Arizona undergraduate students who were randomly recruited, via email, from an established pool of eligible participants that is maintained by the ELS. We used a between groups design where each subject participated in only one of the three treatments. In total, 160 undergraduates (96 male and 64 female) participated: 56 (28 pairs) in the L-value treatment, 52 (26 pairs) in the M-value treatment and 52 (26 pairs) in the H-value treatment. Copies of the experimental instructions are provided in the appendix.

Conditional on their random assignment to treatment, all participants were randomly assigned to either the role of buyer or seller, and then randomly paired with another participant of the

\(^9\) If a buyer’s value was lower than the posted price, then purchasing at the posted price would result in a negative payoff. Whereas, the buyer’s outside option of not buying results in a zero payoff. Hence, all buyers in this case would either try to negotiate a price equal to or less than their value, or not purchase the good.
opposite role. After reading through their role specific instructions, all participants were required to correctly answer two questions about the task to ensure they had reached an adequate understanding before proceeding. Participants then played the flexible price negotiation task one time. In order to make the buyers’ initial purchase or negotiate decision as salient as possible, buyers were specifically told the following when the task began: “As the Buyer, you must decide whether you would like to purchase the golden ticket from the Sellers at price of $10, or negotiate with the Seller by making him/her a counter-offer”. Furthermore, buyers had to actively decide by either clicking a button labeled “BUY” or a button labeled “NEGOTAITE”. Figure 1 shows a screen shot of the exact decision screen that buyers saw in the experiment.

[Figure 1 – Screen Shot of Buyer’s Purchase/Negotiate Decision]

If negotiations commenced (i.e., the buyer explicitly choose to negotiate), the dyad was given 5 minutes to reach an agreement. The negotiation ended when either: (i) the buyer or seller accepted the other parties counter-offer price (in which case the good was transacted at that sale price), or (ii) the 5-minute time allotment elapsed without an accepted counter-offer price. If the 5-minute time allotment was reached, participants were informed of this, and the participant in the pair that was currently acting was given a final opportunity to accept or reject the current counter-offer of the other party.

This final accept/reject termination rule was included to facilitate a higher rate of trade, which is Pareto efficient and generates higher average subject payments. However, neither buyers nor sellers were made aware of this final accept/reject stage prior to starting the negotiation. Furthermore, there was no way for participants to guarantee that they would be the one in the position to be making this final counter-offer (as this was a function of the amount of time spent
by each party making each offer). Therefore, it is highly unlikely that this termination rule influenced the negotiation behavior of either party (i.e., the sequence of counter-offers and/or the total number of counter-offers).

In terms of the information structure, sellers were not informed about the buyer's value or payoff function, and buyers were not informed about the seller’s payoff function. The motivation for implementing this incomplete information set-up regarding payoffs was to minimize the saliency of distributional fairness concerns (e.g., Fehr and Schmidt, 1999) and, thus, isolate the impact of variation in buyer values. In addition, this type of incomplete information structure would be prototypical of real flexible price negotiation settings. In particular, it is unlikely (at the time of negotiations) that the seller would be informed about how much the buyer values the good and the resulting net payoff to the buyer; similarly, it is unlikely that the buyer would be informed about the seller’s cost of selling the good and the resulting net payoff to the seller.

Upon completing the negotiation task, subjects were asked to fill out a short questionnaire to gather some general demographic data. Sessions lasted approximately 30 minutes, and the average experimental earnings (including a $5 show-up payment) were $12.10 USD.

3 Results

We proceed by first presenting the aggregate data and testing for differences across the three treatments. When appropriate, we break the sample into those buyer/seller dyads that reached an agreement prior to the final accept/reject stage, which represents 80% of the full sample. This 80% of the sample can be viewed as those pairs that reached an agreement in the allotted negotiation time, while the other 20% would be those who did not reach an agreement in the time allotment but may still have transacted based on the final accept/reject decision. We then look at
possible heterogeneous treatment effects based on gender and a proxy for negotiation experience. The main findings are summarized along the way while we postpone the discussion and implications for the concluding remarks.

3.1 Aggregate Data

We begin by looking at whether the variation in the buyer’s value impacts the buyer’s propensity to engage in negotiations with the seller. The data reveals that the percentage of buyers who chose to negotiate in the L-Value, M-Value, and H-Value treatments were 93%, 92%, and 96% respectively. A non-parametric Jonckheere-Terpstra test for trend fails to reject the null of equality (p = 0.600). It is worth noting that the percentage of buyers who negotiate, across all three treatments, is likely to be higher than we may see outside the lab, as a result of experimenter demand effects and activity bias. That said, even at these (possibly) higher absolute rates, there is little difference in relative negotiation rates across treatments.

**Result 1**: The buyer’s value for the good does not significantly impact their decision to engage in negotiations with the seller.

Next we look at how the buyer’s valuation impacts the final outcome of the negotiation – the sale price. Table 1 compares the average sale price by treatment, separately for all buyer/seller pairs as well as those pairs that reached an agreement prior to the final accept/reject stage. Looking at the first column of Table 1 (all pairs) we see that the average sale price in the L-Value, M-Value, and H-Values treatments is $6.84, $7.35, and $6.49, respectively. A non-parametric Kruskal-Wallis equality-of-populations test fails to reject the null of equality (p = .540), and a Jonckheere-Terpstra test for trend fails to reject the null of equality (p = 0.402). Similarly, a Mann-Whitney test reveals no significant differences in any of the three pairwise
comparisons of the final sale price across the three treatments. When looking only at the subsample that reached an agreement before the last round of negotiations (second column of Table 1), the data similarly reveals no significant differences in the final sale price across treatments. This leads to the following result:

**Result 2:** The buyer’s value for the good does not significantly impact the final negotiated price.

[Table 1: Effect of Buyer Values on Final Prices]

While the buyer’s value appears to have little impact on the final negotiation price, it is still possible that it could have impacted the negotiation behavior of the buyer; specifically the sequence of counter-offers made by the buyer. Table 2 depicts the sequence of the buyer’s first three counter offers for each of the three treatments. From column 1, the buyer’s 1st counter-offers in the L-Value, M-Value, and H-Values treatments were $3.84, $4.75, and $4.70, respectively. The data does reveal a marginal positive trend between the 1st counter-offer and the buyer’s value (p = .105), and there is a marginally significant difference in the initial counter-offer between the L-Value and M-Value treatments (p = .068). By the 2nd counter-offer there remains a marginally significant difference between the L-Value and M-Value treatments (p = .077). However, by the 3rd counter-offer, there are no more significant differences between the three treatments. Comparing across the sequence of these first three buyer counter-offers, a Kruskal-Wallis test reveals that the main effect of buyer value is narrowly insignificant (p = .114). Taken together, the results regarding the effect the buyer’s value on the buyer’s counter-offer decisions can be summarized as follows:

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10 I only include the first three counter-offers because after this point in the negotiation, the sample size becomes too small for any meaningful analysis.
Result 3: The date reveals some evidence that buyers who have higher values make marginally higher counter-offers, especially for the initial counter-offer.

[Table 2: Effect of Buyer Values on Sequence of Counter-Offers]

While the final sale price is an important dimension on which to evaluate a negotiation, another important dimension of the negotiation process is its length. That is, how long it takes for the negotiating parties to reach an agreement? The length of the negotiation process can be especially important if a delay from a prolonged negotiation process is costly to either of the parties involved. It is possible that the buyer’s value may impact how long it takes to reach a negotiated agreement. Namely, if a buyer’s value impacts their propensity to concede in negotiations, then it may be the case that higher buyer values lead to a more quickly reached agreement. Because we observe the intermediate steps within the negotiation, we are able to explore such a possible relation. As a proxy for the length of the negotiation, we use the total number of combined counter-offers needed by both the buyer and seller to reach an agreement, which we denote as # of negotiating rounds. 11

[Table 3: Effect of Buyer Values on Length of Negotiation (measured as total # of negotiating rounds)]

11 Another measure of the length of the negotiation would be the actual time required to reach an agreement. However, the software did not enable use to measure time to an agreement for each dyad. However, it is likely that the number of negotiating rounds needed to reach an agreement is strongly positively correlated with time, since it takes time to think about and construct counter-offers. Thus, we argue that our results regarding how buyer values impact the number of negotiating rounds would likely generalize to the actual time needed to reach an agreement.
Table 3 compares the mean and median # of negotiating rounds across treatments, separately for all buyer/seller pairs as well as the pairs that reached an agreement prior to the final accept/reject stage. When looking at all pairs, there is very little difference in the # of rounds required to reach an agreement across the three treatments. There is no significant trend in the mean (p = .297), and none of the three pairwise comparisons across treatments are significant. However, if we look at the buyer/seller pairs that actually reached an agreement in the allotted time (i.e., the 80% subsample of pairs that reached an agreement prior to hitting the time limit), then the buyer’s value does seem to impact the number of negotiation rounds. In particular, there is a significant negative trend in the average number of negotiation rounds required (p = .031). Furthermore, significantly more negotiating rounds are needed in the L-Value treatment compared to both the M-Value (p = .074) and the H-Value treatments (p = .053). Hence, the data reveals the following result:

**Result 4:** Buyers with a higher value reach an agreement in significantly fewer negotiation rounds.

### 3.2 Possible Heterogeneous Treatment Effects

The final component of the data analysis involves testing for possible heterogeneous treatment effects. In particular, we explore whether variation in the buyer’s value differentially affects buyer behavior based on the buyer’s gender and negotiating experience. While, in general, there may be other factors that act to mediate the main treatment effect of buyer valuations, we focus on these two factors for several reasons. With regard to gender, there is mature body of literature
documenting gender differences in negotiations. In addition, gender is easily observable. With regard to negotiating experience, it is likely that participants have varying levels of prior negotiating experience, and this level of experience may impact his/her negotiating behavior. In turn, this could influence how a buyer’s value interacts with their negotiating behavior in flexible price negotiations.

[Figure 2: Comparison of Buyer Offers by Treatment and Gender]

Figure 2 displays the average 1st counter-offers of buyers, broken down by treatment and gender of the buyer. From Figure 2, we see that the average 1st counter-offers for male buyers in L-Value, M-Value, and H-Value were $3.80, $4.11, and $4.11, respectively; for female buyers, the corresponding 1st counter-offers were $3.92, $5.39, and $5.15, respectively. In all three treatments, female buyers make higher 1st counter-offers, and this difference is significant for M-Value (p = .068). Furthermore, a Kruskal-Wallis test reveals a significant effect of gender (p = .068). Looking just at male buyers, there is very little difference in 1st counter-offers across treatments. However, for female buyers, the 1st counter-offer in M-Value is significantly higher than L-Value (p = .056). Taken together, the effect of gender on a buyer’s 1st counter-offer is as follows:

**Result 5a:** Female buyers make higher 1st counter-offers, especially in M-Value and H-Value treatments

**Result 5b:** Female buyers appear to be marginally more responsive to changes in their valuations in that they make higher 1st counter-offers when their value is higher

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12 In lieu of citing individual studies from this large body of literature, we refer interested readers to the following studies that provide comprehensive, although not exhaustive, reviews: Walters et al. (1998), Kray and Thompson (2004), Bowles et al. (2007), Seagraves and Gallimore (2013), who discuss gender difference in negotiations; Croson and Gneezy (2009) and Niederle and Vesterlund (2011) who review the role of gender differences in decision making more generally.
As a proxy for negotiating experience, we asked subjects in the post experiment questionnaire if they had bought an item from Craigslist (a secondary market website where transactions are most often negotiated at the time of sale) in the last year. We then classify those subjects that answered yes (52%) as higher experience, and those that answered no (48%) as lower experience. Figure 3 shows the average buyer’s 1st counter-offer, broken down by treatment and experience level. From Figure 3, we see that the average 1st counter-offers for lower experience buyers in L-Value, M-Value, and H-Value were $4.20, $4.78, and $4.73, respectively; for higher experience buyers, the corresponding 1st counter-offers were $3.59, $4.73, and $4.68, respectively. There are no significant differences across experience levels for any of the three treatments. Additionally, a Kruskal-Wallis test does not reveals a significant effect of experience (p = .695). Thus, based on our proxy measure for prior negotiating experience, our data indicates the following:

Result 6: There seems to be very little difference in the buyer’s 1st counter-offer based on whether buyer’s had some prior flexible price negotiating experience.

4 Concluding Remarks

In the exchange of many goods and services, the posted price is flexible; buyers face a choice of whether to purchase the good at the initial posted price, or negotiate the price with the seller. In this paper, we explore if, and to what extent, the buyer’s valuation for the good (relative to the posted price) impacts: (i) a buyer's propensity to negotiate the price, (ii) the counter-offer behavior of buyers, and (iii) the final sale price. To do so, we conduct an experiment where participants engage in a stylized flexible price negotiation task. We then systematically
manipulate the buyer’s valuation for the good across experimental treatments (low value, medium value, and high value), while holding constant the initial posted price. By comparing across treatments we are able to identify how the buyer’s value affects the negotiation process.

The experimental results reveal that variation in buyer values affected some aspects of the negotiation process, but not all aspects. In particular, the buyer’s value had no effect on their decision to negotiate the price and, overall, very high rates of negotiation were observed across all treatments. With regard to the price offers made by buyers, there was some evidence that buyers with higher values made higher 1st and 2nd counter-offers. However, by the 3rd counter-offer there was no significant difference based on the buyer’s value; that is, the buyer’s value did not persistently affect their counter-offers throughout the negotiation process. As a result, the buyer’s value had little effect on the final negotiated sale price. However, the data did reveal that higher buyer values resulted in a shorter negotiation process, i.e. less total counter-offers needed to reach an agreement. Overall, the buyer’s value had little impact on the negotiated price, but the negotiation process was expedited when buyers had higher values.

The data reveals that a very large percentage of buyers (94%) choose to forgo paying the posted price and attempt to negotiate the price. While this percentage may be inflated relative to percentages in the field because of experimenter demand effects, it is suggestive that many buyers will attempt to bargain if given an opportunity. In the setting we consider, as well as most markets with flexible prices, there is no monetary cost or risk associated with negotiating, as buyers can always purchase at the original posted price; hence we would expect high rates of negotiating. This is consistent with the conventional wisdom that “it never hurts to ask” for a discount. The large fraction of bargainers/hagglers also has possible important theoretical implications regarding sellers’ decisions about flexible pricing. For example, in the 2-seller
model of Desai and Purohit (2004), a large fraction of hagglers results in fixed pricing yielding higher profits than flexible pricing; thus, firms may prefer committing to fixed prices. In the $N \geq 2$ seller model of Gill and Thanassoulis (2009) and the 2-seller model of Gill and Thanassoulis (2013) where firms can’t commit to a fixed price, a large fraction of bargainers results in higher list prices and higher negotiated prices. In this case, the presences of a large fraction of bargainers may benefit sellers and, as concluded by Gill and Thanassoulis (2009), “too many bargainers can indeed spoil the broth” (p. 668).

Our results also reveal that buyer values do not significantly impact the final negotiated price. While we implement a structured alternate-offer style negotiation process, this result would be consistent with the prediction of the generalized Nash bargaining solution. In particular, the Nash product in our setting would be: $(V - p_f - d^B)\beta \times (p_f - d^S)^{1-\beta}$ where $V$ is the buyer’s value, $p_f$ is the final negotiated sale price, $d^B$ is the buyer’s disagreement point, $d^S$ is the seller’s disagreement point, and $\beta$ and $1-\beta$ are the buyer’s and seller’s bargaining powers, respectively. Given that the buyer could buy at the posted price, $d^B = V - p_p$ where $p_p$ represented the posted price, and $d^S = 0$. So the Nash product simplifies to $(p_p - p_f)\beta \times (p_f)^{1-\beta}$, which we can see does not depend on $V$. Thus, the Nash bargaining solution (i.e., the $p_f$ that maximizes the Nash product) does not depend on $V$. If $\beta = \frac{1}{2}$ (i.e., equal bargaining power between buyer and seller), then the Nash bargaining solution is $p_f = 5$. We observe higher final sale prices (average of $6.90 across treatments), which suggests that sellers, on average, are exhibiting relatively more bargaining power/skill. In terms of theoretical applications, Bester (1993), Wang (1995) and Desai and Purohit (2004) assume the Nash bargaining solution as the outcome of the price negotiation in their models of flexible prices. Our findings indicate that modeling the outcome of the price negotiation as the Nash bargaining solution may be both reasonable and accurate.
As mentioned in the introduction, several prior studies have documented the importance of a reference point and the distinction between whether the negotiation is in the domain of gains or losses. In our setting, since values are higher than the posted price in all treatments, all buyers are in the domain of gains. That said, assuming they use their value as the reference point, the higher their value the bigger the gain. This allows us to shed light on how buyer behavior varies within the gain domain. What we find is that the higher the buyer’s value, the higher the initial counter-offer and the less offers needed to settle the negotiation. This provides further support for the idea that buyer values act as the dominant reference point (White et al., 1994; Kristensen and Garling, 1997b; 1997c), and that buyers negotiate less aggressively when (further) in the domain of gains (Bazerman et al., 1985; Neale et al., 1987; Neale and Bazerman; 1991; Kristensen and Garling, 1997a; 2000).

Engaging in bi-lateral price negotiations often requires the expenditure of costly resources, in the form of money, time, and/or emotions. As a result, there can be possible efficiency gains if long, drawn-out negotiations are avoided. One may be inclined to think that by lowering the posted price or offering discounts, a seller could help circumvent such costly negotiations. Our results suggest that lowering the posted price (i.e., increasing the difference between a buyer’s value and the posted price) may not reduce the propensity of buyers to attempt to negotiate the price. However, by lowering the posted price or offering a discount, sellers may be able to shorten the negotiation process by reducing the number of offers/exchanges needed to reach an agreement.
References


Appendix – Copy of all Experimental Instructions

General Experimental Procedure Instructions

(Read Aloud to All Participants at the Start of the Experiment)

Welcome to the ESL, and thank you for participating. In this experiment, you will be participating in a 2-person decision task. In the task, you will be randomly assigned to either the role of the BUYER or the role of the SELLER, and then randomly and anonymously paired with another participant of the opposite role as yours. Momentarily, I will launch the experimental software, which will first indicate the player role you have been assigned. Please remain on this screen while I come around and hand out the full set of instructions for the task. Please quietly and carefully read through all the instructions. After you have read through the instructions, you will be prompted to click the continue button at the bottom of your screen to proceed. From this point forward, please carefully follow all the prompts on the computer screen as you proceed through the experiment. You will first be asked to correctly answer 2 questions about the task to ensure that you have reached an adequate understanding of the task and its payoff structure. Once you have correctly answered these two questions, the actual decision task will begin. After everyone has finished the task, you will then be asked to fill out a short 10-question questionnaire, which will last about 2 minutes. Once the questionnaire has ended, you will be prompted to the final payment screen, where the outcome of the task and your total experimental earnings will be displayed to you. At this point, please remain quietly in your seat until and experimenter comes to your carrel and privately pays you’re your earnings. After, you have been paid you may quietly exit one of the 2 doors on the left. For the remainder of the experiment there is to be no talking or interaction with other participants of any kind. Thank you for your cooperation.
Participant Instructions

Player Role: SELLER

Welcome and thank you for participating! Your participation in this experiment is VOLUNTARY. Please read these instructions carefully. Do not talk to your neighbors. Please remain quiet during the entire experiment. Please raise your hand if you have any questions and an experimenter will come by and answer them privately. You may also refer back to these instructions at any time. All remaining decisions in during this experiment are to be completed individually, and verbal interaction with other participants is strictly PROHIBITED. Thank you for your cooperation.

You will receive a $5 show-up payment for participating. In addition, you can receive additional compensation based on your randomly assigned player role, the decision(s) that you make in the decision task described below, and/or the decisions made by the other participant with whom you have been randomly matched. Upon completion of the decision task, please remain quietly seated in your carrel and wait until an experimenter comes to you and privately pays you your experimental earnings. After you have been paid, you will be free to quietly exit the lab.

Decision Task:

You have been randomly assigned the role of: SELLER. In this experiment, there is a fictitious good called a “golden ticket”. As the seller you have one golden ticket. In addition, you have been randomly paired with another participant in the lab who has been randomly assigned to the role of BUYER. The buyer is interested in buying the golden ticket that you have. Your earnings from participating in this task will depend on whether or not you are able to sell the golden ticket to the buyer as follows:

You sell the golden ticket: If you are able to sell the golden ticket to the buyer, then you will receive the price the buyer paid (in dollars) as payment for the golden ticket, plus the $5 show-up payment.

You do not sell the golden ticket: If you are not able to sell the golden ticket to the buyer, then you will only receive the $5 show-up payment because the golden ticket has no additional value to you.

Whether or not you sell the golden ticket to the buyer will depend on the outcome that results from your interaction with the buyer.

This interaction between you and the buyer will take place as follows:

The initial posted price that you can sell the golden ticket for has been pre-set to $10.00. First, the buyer will have an opportunity to purchase the golden ticket from you at this initial posted price of $10.00. If the buyer chooses to purchases the golden ticket from you at the initial price,
the golden ticket is then sold to the buyer at the $10 initial price, and the task ends. You will receive the $10 price paid by the buyer as payment.

If the buyer does not purchase the golden ticket at the initial price, then the buyer will have an opportunity to negotiate with you over the price of the golden ticket. If the buyer decides to engage in negotiations, he/she will do so by proposing to you a counter-offer price between $0 and $10. At that point, you will have two options: (1) you may accept the counter-offer price proposed by the buyer, or (2) you may continue negotiating with the buyer. If you accept the buyer’s proposed counter-offer price, then the golden ticket is then sold to the buyer at the buyer’s proposed price, and the task ends. You will receive the price that the buyer proposed in the counter-offer as payment for the golden ticket.

If you choose to continue negotiations with the buyer, you will do so by proposing a counter-offer price between $0 and $10 back to the buyer. Again, the buyer will then have an opportunity to buy the golden ticket at your proposed counter-offer price, or continue negotiating with you. If the buyer accepts your proposed price, the golden ticket is then sold to the buyer at your proposed price, and the task ends. You will receive the price proposed in your counter-offer as payment for the golden ticket.

If the buyer chooses to continue negotiations, he/she will then make another proposed counter-offer price between $0 and $10 back to you. You will then have an opportunity to accept this proposed price by the buyer, or continue negotiations by making a proposed counter-offer between $0 and $10 back to the buyer. This alternating process of making a proposed counter-offer price between you and the buyer will continue until one of the following two things happens:

i) You accept the buyer’s proposed counter-offer price, or the buyer accepts your proposed counter-offer price. If this happens, the golden ticket is sold to the buyer at that proposed price, and the task will end. You will receive the proposed price as payment for the golden ticket.

ii) You and the buyer have negotiated for the maximum allowable time of 5 minutes without you or the buyer accepting the price proposed by the other for the golden ticket. If after this 5 minute time allotment you and the buyer have not reached an agreement on the price, then you will not sell the golden ticket to the buyer. The task will end, and will receive zero payment for the golden ticket.

If you and the buyer begin negotiating, then you will both be given a maximum of 30 seconds to make each of the negotiation decisions you face. That is, both you and the buyer will have a maximum of 30 seconds to decide whether or not to accept a counter-offer price (when applicable), and a maximum of 30 seconds to decide on the amount of the counter-offer price (when applicable).

Questionnaire:

After the decision task, you will be asked to complete a short questionnaire. Your answers to the questionnaire are confidential will not be shared with any other participants.
Payment:

After you have finished the decision task and the questionnaire, please remain quietly seated in your carrel until all participants have finished the task and the questionnaire, and the experiment has ended. At that time, an experimenter will come to you and individually pay you your earnings for the experiment. Again, your total earnings for the experiment will be either: (i) the sum of the payment you received from the buyer for the golden ticket (if you were able to sell the golden ticket to the buyer) plus the $5 show-up payment, or (ii) just the $5 show-up payment (if you were unable to sell the golden ticket to the buyer). After you receive your payment, please then quietly exit the lab.

Thank you for your cooperation and participation!
Participant Instructions

Player Role: **BUYER**\(^{13}\)

Welcome and thank you for participating! Your participation in this experiment is **VOLUNTARY**. Please read these instructions carefully. Do not talk to your neighbors. Please remain quiet during the entire experiment. Please raise your hand if you have any questions and an experimenter will come by and answer them privately. You may also refer back to these instructions at any time. All remaining decisions in during this experiment are to be completed individually, and verbal interaction with other participants is strictly **PROHIBITED**. Thank you for your cooperation.

You will receive a $5 show-up payment for participating. In addition, you can receive additional compensation based on your randomly assigned player role, the decision(s) that you make in the decision task described below, and/or the decisions made by the other participant with whom you have been randomly matched. Upon completion of the decision task, please remain quietly seated in your carrel and wait until an experimenter comes to you and privately pays you your experimental earnings. After you have been paid, you will be free to quietly exit the lab.

**Decision Task:**

You have been randomly assigned the role of: **BUYER**. In this experiment, there is a fictitious good called a “golden ticket”. As the buyer, you are interested in purchasing a golden ticket, which has value to you. Specifically, your value for this golden ticket is $18. In addition, you have been randomly paired with another participant in the lab who has been assigned to the role of **SELLER**. This seller has been given a golden ticket, and is interested in selling that golden ticket to you. Your earnings from participating in this task will depend on whether or not you are able to buy the golden ticket from the seller as follows:

**You buy the golden ticket:** If you are able to buy the golden ticket from the seller, then you will earn the difference between your value of $18 and the price you paid to the seller (in dollars) for the golden ticket, **plus** the $5 show-up payment.

**You do not buy the golden ticket:** If you are not able to buy the golden ticket from the seller, then you will only receive the $5 show-up payment.

Whether or not you buy the golden ticket from the seller will depend on the outcome that results from your interaction with the seller.

This interaction between you and the seller will take place as follows:

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\(^{13}\) These instructions correspond to the H-Value treatment where the buyer’s induced private value for the golden ticket was set to $18. In the other two treatments, the experimental instructions for the buyers were identical, except the buyer’s value was changed in the instructions to match that of the treatment.
First, you will have an opportunity to purchase the golden ticket from the seller at the initial posted price, which has been pre-set to: $10. If you choose to buy the golden ticket from the seller at the initial price, then the golden ticket is sold to you for $10, and the task ends. You will receive $18 minus the $10 price you paid to the seller as payment for purchasing the golden ticket.

If you choose not to purchase the golden ticket at the initial price, then you will have an opportunity to negotiate with the seller over the price of the golden ticket. If you decide to engage in negotiations, you will do so by proposing to the seller a counter-offer price between $0 and $10. At that point, the seller will have two options: (1) the seller may accept your proposed counter-offer price, or (2) the seller may continue negotiating with you. If the seller accepts your proposed counter-offer price, then you have bought the golden ticket at your proposed price, and the task ends. You will receive $18 minus your proposed counter-offer price as payment for buying the golden ticket.

If the seller chooses to continue negotiations with you, then he/she will do so by proposing a counter-offer price between $0 and $10 back to you. Again, you will then have an opportunity to buy the golden ticket from the seller at the seller’s proposed counter-off price, or continue negotiating with the seller. If you accept the seller’s proposed price, then you have bought the golden ticket at the seller’s proposed price, and the task ends. You will receive $18 minus the seller’s proposed counter-offer price as payment for purchasing the golden ticket.

If you choose to continue negotiations, you will then make a proposed counter-offer price between $0 and $10 back to the seller. The seller will then have an opportunity to accept your proposed price or continue negotiations by making a proposed counter-offer between $0 and $10 back to you. This alternating process of making a proposed counter-offer price between you and the seller will continue until one of the following two things happens:

i) You accept the seller’s proposed counter-offer price, or the seller accepts your proposed counter-offer price. If this happens, you will have bought the golden ticket from the seller at that proposed price, and the task will end. You will receive $18 minus the accepted proposed price as payment.

ii) You and the seller have negotiated for the maximum allowable time of 5 minutes without you or the seller accepting the price proposed by the other for the golden ticket. If after this 5 minute time allotment you and the seller have not reached an agreement on the price, then you will not buy the golden ticket from the seller. The task will end, and will receive zero payment because you did not purchase the golden ticket.

If you and the seller begin negotiating, then you will both be given a maximum of 30 seconds to make each of the negotiation decisions you face. That is, you and the seller will have a maximum of 30 seconds to decide whether or not to accept a counter-offer price (when applicable), and a maximum of 30 seconds to decide on the amount of the counter-offer price (when applicable).

Questionnaire:

After the decision task you will be asked to complete a short questionnaire. Your answers to the questionnaire are confidential will not be shared with any other participants.
Payment:

After you have finished the decision task and the questionnaire, please remain quietly seated in your carrel until all participants have finished the task and the questionnaire, and the experiment has ended. At that time, an experimenter will come to you and individually pay you your earnings for the experiment. Again, your total earnings for the experiment will be either: (i) your value of $18 minus the price you paid to the seller for the golden ticket (if you were able to buy the golden ticket from the seller) plus the $5 show-up payment, or (ii) just the $5 show-up payment (if you were unable to buy the golden ticket from the seller). After you receive your payment, please then quietly exit the lab.

Thank you for your cooperation and participation!
Figure 1 – Screen Shot of Buyer’s Purchase/Negotiate Decision

As the Buyer, you must decide whether you would like to purchase the golden ticket from the Sellers at price of $10, or negotiate with the Seller by making him/her a counter-offer.

Please make your decision below by clicking the corresponding button below.

- Click to buy the golden ticket for $10
- Click to negotiate the price with the Seller
Table 1: Effect of Buyer Values on Final Prices

<table>
<thead>
<tr>
<th>Treatment</th>
<th>All Pairs</th>
<th>Sale Price</th>
<th>Pairs that agreed before the last round</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-Value</td>
<td>$6.84</td>
<td></td>
<td>$6.99</td>
<td></td>
</tr>
<tr>
<td>M-Value</td>
<td>$7.35</td>
<td></td>
<td>$7.46</td>
<td></td>
</tr>
<tr>
<td>H-Value</td>
<td>$6.49</td>
<td></td>
<td>$7.21</td>
<td></td>
</tr>
</tbody>
</table>

**Treatment Effects**

<table>
<thead>
<tr>
<th></th>
<th>All Pairs</th>
<th>Sale Price</th>
<th>Pairs that agreed before the last round</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis of Variance</td>
<td>$p = .540</td>
<td>$p = .538</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trend Test</td>
<td>$p = .402</td>
<td>$p = .130</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L-Value vs M-Value</td>
<td>$p = .116</td>
<td>$p = .187</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L-Value vs H-Value</td>
<td>$p = .504</td>
<td>$p = .166</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-Value vs H-Value</td>
<td>$p = .762</td>
<td>$p = .639</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: All reported measures are treatment-level averages. Reported $p$-values for Analysis of Variance are from a non-parametric Kruskal–Wallis Test. Reported $p$-value for Trend test are from a Jonckheere-Terpstra non-parametric test. Reported $p$-values for pairwise comparisons are from a Mann-Whitney test.
Table 2: Effect of Buyer Values on Counter-Offer

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1st Counter-Offer</th>
<th>2nd Counter-Offer</th>
<th>3rd Counter-Offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-Value</td>
<td>$3.84</td>
<td>$4.85</td>
<td>$5.97</td>
</tr>
<tr>
<td>M-Value</td>
<td>$4.75</td>
<td>$5.79</td>
<td>$6.49</td>
</tr>
<tr>
<td>H-Value</td>
<td>$4.70</td>
<td>$5.28</td>
<td>$4.81</td>
</tr>
</tbody>
</table>

**Treatment Effects**

- **Analysis of Variance**
  - L-Value vs M-Value: $p = .068$
  - L-Value vs H-Value: $p = .142$
  - M-Value vs H-Value: $p = .437$

- **Trend Test**
  - $p = .312$
  - $p = .381$
  - $p = .271$
  - $p = .105$
  - $p = .251$
  - $p = .769$

- **Notes:** All reported measures are treatment-level averages. Reported $p$-values for Analysis of Variance are from a non-parametric Kruskal–Wallis Test. Reported $p$-values for Trend test are from a Jonckheere-Terpstra non-parametric test. Reported $p$-values for pairwise comparisons are from a Mann-Whitney U-test.
Table 3: Effect of Buyer Values on Length of Negotiation (measured as total # of negotiating rounds)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>All Pairs</th>
<th>Pairs that agreed before the last round</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td>Low Value</td>
<td>7.62</td>
<td>8</td>
</tr>
<tr>
<td>Medium Value</td>
<td>6.88</td>
<td>6</td>
</tr>
<tr>
<td>High Value</td>
<td>7.16</td>
<td>6</td>
</tr>
</tbody>
</table>

Effect of Variance

| Analysis of Variance | p = .785 | p = .185 |
| Trend Test          | p = .297 | p = .031 |
| L-Var vs M-Var      | p = .213 | p = .074 |
| L-Var vs H-Var      | p = .171 | p = .053 |
| M-Var vs H-Var      | p = .536 | p = .272 |

Notes: All reported measures are treatment-level averages. Reported p-values for Analysis of Variance are from a non-parametric Kruskal–Wallis Test. Reported p-value for Trend test are from a Jonckheere-Terpstra non-parametric test. Reported p-values for pairwise comparisons are from a Mann-Whitney test.
Figure 2: Comparison of Buyer Offers by Treatment and Gender

![Graph showing comparison of buyer offers by treatment and gender.](image)

Figure 3: Comparison of Buyer Offers by Treatment and Negotiating Experience

![Graph showing comparison of buyer offers by treatment and negotiating experience.](image)